GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO – 486
ANSWERED ON 23/07/2025

NUCLEAR WASTE MANAGEMENT SYSTEM

486. SHRI SAPTAGIRI SANKAR ULAKA

Will the PRIME MINISTER be pleased to state:-

(a) the total volume of nuclear waste, categorized as low, intermediate and high-level, generated annually in India during the last ten years along with the projected waste volumes based on planned capacity expansion;
(b) whether there have been any accidents, leaks or safety incidents have occurred at nuclear waste management or interim storage facilities during the said period;
(c) the current status of clearance and disposal for nuclear waste including the total quantity cleared so far indicating the locations where disposal has taken place or is planned and any pending clearances; and
(d) the details of safeguards and procedures implemented to ensure safe storage, handling and disposal of nuclear waste at these sites?

ANSWER

THE MINISTER OF STATE FOR PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH)

(a) The wastes generated at the nuclear power stations during their operation are of low and intermediate radioactivity level. These wastes are appropriately treated, concentrated and subjected to volume reduction. The concentrates are immobilized in inert materials like cement, bitumen, polymers etc. and stored in specially constructed structures (near surface disposal facilities) located at the site under monitoring. The treated liquids and gases are diluted and discharged under continuous monitoring, ensuring that the discharges are well within the stipulated limits set by Atomic Energy Regulatory Board (AERB). The radioactivity level of the stored wastes reduces with time and by the end of the plant life, falls to very low levels. The releases are also monitored by AERB.

The volume of low and intermediate level wastes generated from the operating nuclear power stations annually during the last 10 years was about 1.25 lakh cubic meter (m3) and 130 cubic meter (m3) respectively. The projections of waste generation for future would depend on the actual capacity additions and technologies adopted.

During the recycling of spent nuclear fuel (SNF) small amount of liquid radioactive wastes are generated which are classified as low, intermediate and high level as per the safety guidelines of Atomic Energy Regulatory Board (AERB) and Bhabha Atomic Research Centre Safety Council (BSC). Current strategy for their management involves treatment of intermediate level waste to convert it to low and high-level wastes followed by immobilization of high level waste to vitrified glass. Total volume of vitrified waste generated by processing one metric ton of Pressurised Heavy Water (PHWR) spent nuclear fuel is around 0.2 m^3.

(b) There has been no incident of release of radioactivity from Nuclear Waste Management Facilities nor any incident/accident at the waste management plants/interim storage Facilities during the said period.

(c) Radioactive nuclear waste is systematically treated, conditioned, and monitored prior to its disposal at designated storage locations. This is a continuous process, and there is no backlog of conditioned waste awaiting disposal at interim storage facilities.

The low half life solid waste from nuclear facilities is disposed in specially constructed engineered structures in Near Surface Disposal Facility within the boundary of facility. These disposal facilities are co-located near reactor/nuclear facilities to avoid transportation of radioactive waste through public domain. All the Nuclear Power Plant (NPP) sites have Near Surface Disposal of Radioactive Solid Waste (NSDF) at the site except Kudankulam Nuclear Power Plant (KKNPP), where waste is stored in engineered modules within the facility.

(d) The nuclear waste handling, treatment, storage and disposal are carried out as per the well laid down procedures and guidelines stipulated by the AERB in accordance with the Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 and the

requirements of AERB Safety Code on ‘Management of Radioactive Waste (AERB/SC/RW)’. The adherence to these is verified through periodic inspection conducted by AERB. The handling and disposal area is kept under surveillance by the facility management. The environmental monitoring is carried out by Environmental Survey Laboratories (ESLs) of BARC. The results do not indicate any buildup of radioactivity in the environment and annual doses are well below AERB specified limits.

Comprehensive safeguards and well-established procedures are implemented to ensure the safe storage, handling, and disposal of nuclear waste. Waste management practices are governed by stringent regulatory standards and are designed to protect operating personnel, the public, and the environment. Radioactive waste is segregated based on its activity level, treated using appropriate techniques such as chemical decontamination, absorption, ion exchange/membrane separations and volume reduction, and then conditioned into stable forms suitable for storage. Engineered storage systems with multiple containment barriers, radiation shielding, and leak detection mechanisms are employed to prevent any release of radioactivity. Waste handling operations are conducted using remote or shielded systems, wherever necessary, and under strict radiological surveillance. Regular monitoring, periodic safety reviews, and adherence to approved waste disposal protocols ensure continued safety throughout the lifecycle of waste management.

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